

CR

(Carriage return)

Name Carriage return

Format CHR\$(13);

Function To return the pen carriage to the beginning of a line.

When a carriage return is sent to the HI-80 in the printer mode it is normally the case that the pen carriage is required on a new line as well as being at the beginning of the line. This may be achieved in a number of ways.

- 1) If the AUTO FEED XT (pin 14 on the interface connector) is held "LOW" a single line feed will be added to a carriage return. This can occur if pin 14 is connected to the computer by the interface cable, and is held "LOW" by the computer. It can also be held "LOW" if pin 14 is wired to logical ground.
- 2) If DIP SW-2 is in the ON position, a line feed is automatically added to the carriage return. If pin 14 of the connector cable is held "LOW", the line feed will be added no matter whether DIP SW-2 is ON or OFF.
- 3) The computer can send a line feed with a carriage return. Your computer manual should tell you if this is so. If the computer does send a line feed, and either pin 14 is held "LOW" or the DIP switch is set to ON, double line spacing will result. This can be cured by setting the DIP switch to OFF, and breaking the connection to pin 14.

When a line feed is added to a carriage return, enlarged printing set by the SO command code or the ESC SO code will be cancelled, but not if it has been set by ESC W (1)_D code.

If it is required simply to set the carriage to the beginning of the line without adding a line feed use the <ESC> "<" command.

ASCII code sequence

Decimal	(13) _D
Hexadecimal	<0D> _H

ESC <

(Pen left)

Name Move pen to left margin

Format CHR\$(27); "<";

Function To produce a carriage return without adding a line feed.

The HI-80 will not go onto a new line. This command is used to produce unidirectional printing on other EPSON printers.

ASCII code sequence

Decimal	(27) _D (60) _D
Hexadecimal	<1B> _H <3C> _H

GS C (n)

(Pen Colour)

Name Pen colour selection

Format CHR\$(29); "C" ; CHR\$(n);

Function To select the pen used for printing.

The command is similar to the plotter mode 0 command "SPn", and plotter mode 1 command "Jn". In the printer mode however, the pen selection number MUST be an ASCII code 0 to 8 and not the code for the digit from 1 to 8.

The pen chosen according to the number (n) as follows:

n = 0	the pens are stored and capped
n = 1 or n = 5	pen number 1 is selected
n = 2 or n = 6	pen number 2 is selected
n = 3 or n = 7	pen number 3 is selected
n = 4 or n = 8	pen number 4 is selected

If an attempt to print a code which is not in the ASCII range 0 to 8 (except 255) the pen will not change.

If the value of n = 255, the pen will be capped in the same way that the "SP -1" command allows following commands to act immediately without the need to press the CAP/OFF switch.

Full details of the pen modes can be found in the plotter section, under the "SP" command in mode 0 and "J" command in mode 1.

ASCII code sequence

Decimal	(29) _D (67) _D (n)
Hexadecimal	<1D> _H <43> _H <n>

Where (n) or <n> is an ASCII code in the range 0 to 8 or the code (255)_D.

GS D (n)

(Printing Direction)

Name Set printing direction.

Format CHR\$(29); "D" ; CHR\$(n);

Function To set the direction of printing to be either across or down the paper.

The value of (n) can be either 0 or 1.

If n = 0 the characters are printed along the shortest side of the paper (portrait position) i.e. along the Y axis with the line feeds in the X direction. This is the way a letter would normally be typed or printed on a daisy wheel or dot matrix printer.

If n = 1, the characters are printed along the longest side of the paper (landscape position) i.e. along the X axis with the line feeds in the Y direction. This is in agreement with the way a graph is normally plotted.

When the <GS> "D" (1)_D command is given, the paper change procedure will be invoked. When the ONLINE button is pressed after resetting the paper, the paper will be moved to show the printing area and will then be set in the top left hand corner for the landscape position. Line feeds will then take place in the Y direction.

Whenever this command sequence is given, all format commands are cleared to the default values for that direction of printing. Printing is carried out according to the size of the window area. If a character would be printed over the edge of the window, a carriage return is executed before the character is printed to ensure that clipping will not occur.

ASCII code sequence

Decimal	(29) _D (68) _D (n)
Hexadecimal	<1D> _H <44> _H <n>

Where n is either "0" or "1".

GS C (n)

Name Pen colour selection

Format CHR\$(29); "C"; CHR\$(n);

Function To select the pen used for printing.

The command is similar to the plotter mode 1 command "Jn". In the selection number MUST be an ASCII code for the digit from 1 to 8.

The pen chosen according to the

n = 0

n = 1 or n = 5

n = 2 or n = 6

n = 3 or n = 7

n = 4 or n = 8

If an attempt to print (except 255) the pen

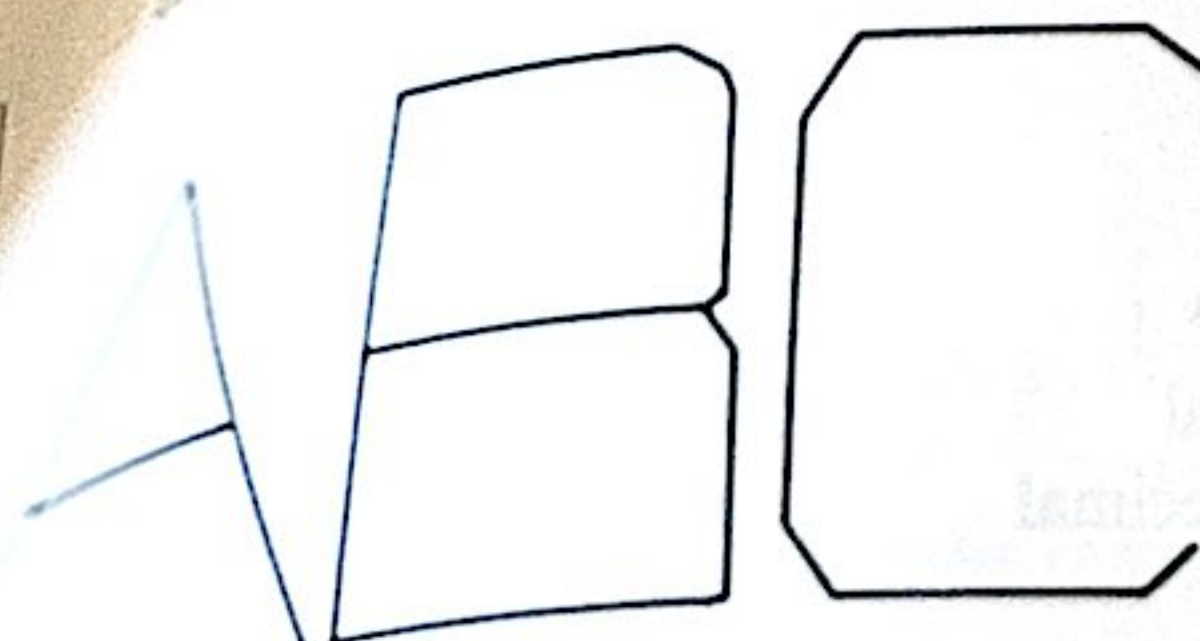
If the value of n = the "SP-1" command without the n

Full details of the "SP"

ASCII code sequence

Decimal
Hexade

When
(255)



Pen position

(29)_D (71)_D

<1D>_H <47>_H

ESC s

(Change speed)

Name Speed change

Format CHR\$(27); "s"; CHR\$(n);

Function To set the pen printing speed to draw the lines of the characters at 100 or 230 mm/sec.

When the value of (n) is 0 normal speed (230 mm/sec) is selected.

When the value of (n) is 1 half speed (110 mm/sec) is selected.

Because this command only alters the speed of drawing the lines it will only be seen to be effective if large size characters are drawn, since much of the drawing of characters involves movement of the pen without drawing.

ASCII code sequence

(27)_D (115)_D (n)
<1B>_H <73>_H <n>

GS G

(Graphics)

Name Graphics (plotter) mode

Format CHR\$(29) "G"

Function To change the mode of operation from printer mode to plotter mode.

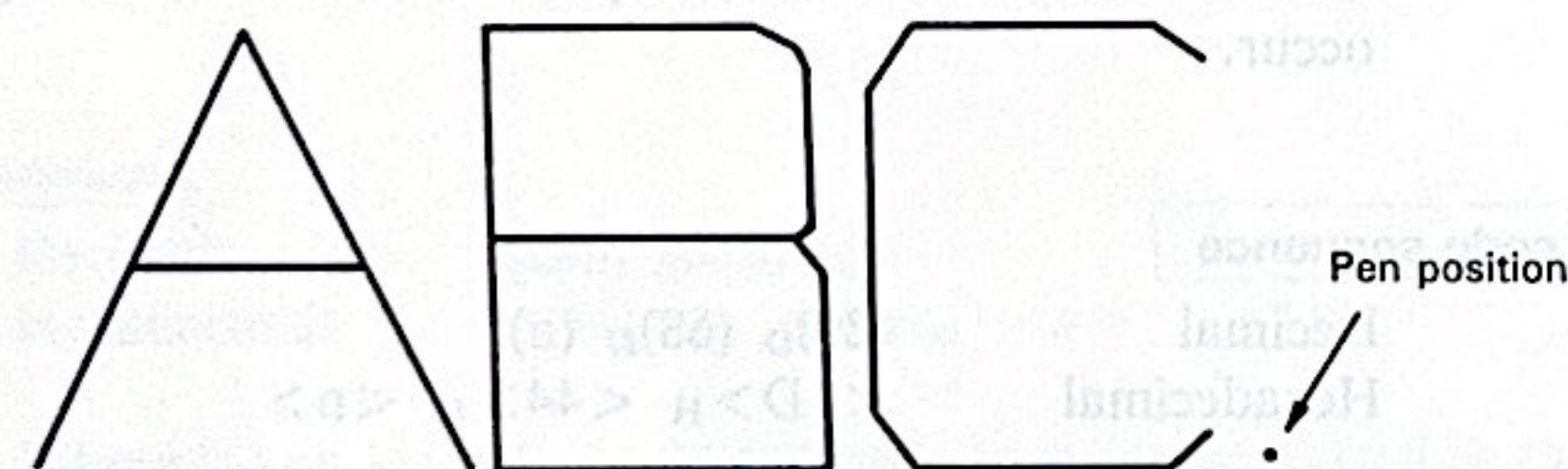
When this command is executed, subsequent commands are treated as plotter commands. If the printer mode has been set by pressing the CAP/OFF button when switching the HI-80 on, the graphics mode will be the mode determined by the DIP switch setting. If the printer mode was entered by sending the ASCII code (18)_D when in mode 0, then the graphics mode will be mode 0 irrespective of the DIP switch setting.

The character size, rotation etc of the characters will not be changed, so that printing with the "LA" command in plotter mode 0, or the "P" command in plotter mode 1 will be consistent with text printed in the printer mode.

The pen will not be changed.

All formats for printing characters will be lost.

The pen position will not be changed. When printing a character, the position of the pen is left at the bottom right hand corner of the character block as shown in the diagram.



ASCII code sequence

Decimal (29)_D (71)_D
Hexadecimal <1D>_H <47>_H

ESC s

(Change speed)

Name Speed change

Format CHR\$(27); "s"; CHR\$(n);

Function To set the pen printing speed to draw the lines of the characters at 100 or 230 mm/sec.

When the value of (n) is 0 normal speed (230 mm/ sec) is selected.

When the value of (n) is 1 half speed (110 mm/sec) is selected.

Because this command only alters the speed of drawing the lines it will only be seen to be effective if large size characters are drawn, since much of the drawing of characters involves movement of the pen without drawing.

ASCII code sequence

Decimal (27)_D (115)_D (n)
Hexadecimal <1B>_H <73>_H <n>

Where n is either 0 or 1.

6.2 Commands Affecting Character Size

SI

(Condensed Character)

Name

Shift in

Format

CHR\$(15)

Function

To set the print mode to give condensed characters.

The characters printed when the SI character (ASCII code 15 or CTRL-O) is sent to the printer are reduced to 7/12 of the normal size.

If the width or height has been altered by using the <GS> "W" or <GS> "H" commands, the size will be 7/12 of the size of the character printed before the SI character was sent to the printer.

If the SO character or either of the sequences <ESC> SO or <ESC> "W" (1) (enlarged mode sequences) is sent to the HI-80 whilst it is set to print condensed characters, the character size will be printed at 7/6 of the normal size. This is known as enhanced or condensed and expanded printing. The enhanced size characters can also be obtained if one of these sequences has set the printer into enlarged mode and the SI character is then sent.

A DC2 character (ASCII code (18)_D) is used to release the condensed mode. If the enhanced mode is set, the HI-80 will return to enlarged mode when the DC2 character is sent.

Examples

```
10 LPRINT "This is normal printing"
20 LPRINT CHR$(15); "This is condensed printing"
30 LPRINT "This is still condensed printing"
40 LPRINT CHR$(14); "This is now enhanced"
50 LPRINT "This is condensed again"
60 LPRINT CHR$(18);
70 LPRINT "This is normal"
```

This is normal printing
This is condensed printing
This is still condensed printing
This is now enhanced
This is condensed again
This is normal

Notes:

- (i) The carriage return at the end of line 40 has switched off the enlarged printing so that line 50 is printed condensed.
- (ii) The semi-colon at the end of line 60 prevents a carriage return being sent which would give a blank line.

ASCII code sequence

Decimal	(15) _D
Hexadecimal	<0F> _H

ESC SI

(Condensed Characters)

Name ESCAPE Shift In

Format CHR\$(27) ; CHR\$(15);

Function To set condensed print.
This command duplicates the SI command.

ASCII code sequence

Decimal (27)_D (15)_D
Hexadecimal <1B>_H <0F>_H

DC2

(Cancel Condensed)

Name Condensed print mode cancel

Format CHR\$(18);

Function To reset the condensed mode set by the SI character or the <ESC> SI sequence.

Example See SI command.

ASCII code sequence

Decimal (18)_D
Hexadecimal <12>_H

SO

(Enlarge)

Name Shift Out

Format CHR\$(14);

Function To set enlarged (double width) printing until a line feed is carried out.

The characters printed when the SO character (ASCII code (14)_D or CTRL-N) is sent to the printer are printed at twice the width.

If the width or height has been altered by using the <GS> "W" or <GS> "H" commands, the width will be twice that of the character printed before the SO character was sent to the printer.

If the SO character is sent to the HI-80 whilst it is set to print condensed characters, the character size will be printed at 7/6 of the normal size. This is known as enhanced or condensed and expanded printing. An example of enhanced printing is shown under the SI command.

The enlarged mode set by the SO character can be released in one of the following ways:

- (i) By a line feed (and hence a carriage return when the line feed is added by the HI-80 or the computer).
- (ii) By a DC4 character (ASCII code (20)_D or CTRL-T). If the enhanced mode is set, the HI-80 will return to enlarged mode when the DC2 character is sent, provided that a carriage return or line feed has not been sent in the meantime or at the same time.
- (iii) By sending the sequence <ESC> W (0)_D

Examples

```
10 LPRINT "Normal text"
20 LPRINT CHR$(14); "Enlarged text"
30 LPRINT "Normal text"
40 LPRINT CHR$(14); "Enlarged "; CHR$(20); "Normal ";
   CHR$(14); "and Enlarged"
```

```
Normal text
Enlarged text
Normal text
Enlarged Normal and Enlarged
```

ASCII code sequence

Decimal	(14) _D
Hexadecimal	<0E> _H

ESC SO

(Enlarged Characters)

Name ESCAPE Shift Out

Format CHR\$(27); CHR\$(14);

Function To set enlarged (double width) print.
This command duplicates the SO command.

ASCII code sequence

Decimal	(27) _D	(14) _D
Hexadecimal	<1B> _H	<0E> _H

DC4

(Cancel Enlarged)

Name Enlarged print mode cancel

Format CHR\$(20);

Function To reset the enlarged mode set by the SO character or the <ESC> SO and <ESC> W (1)_D sequence.

Example See SO command.

ASCII code sequence

Decimal	(20) _D
Hexadecimal	<14> _H

ESC W (n)

(Enlarged Mode)

Name Enlarged mode

Format CHR\$(27); "W" ; CHR\$(n);

Function To set the enlarged printing mode and cancel it when required.

In contrast to the enlarged mode set with the SO character or <ESC> SO sequence, when the <ESC> W (1)_D sequence has set the enlarged mode, it is not cancelled by a line feed.

The value of (n) can be either 0 or 1.

If n = 1 the enlarged mode is set until it cancelled.

If n = 0 the enlarged mode set either by this command or the SO character or the <ESC> SO sequence is cancelled.

The enlarged mode set by the <ESC> W (1)_D sequence can also be cancelled with the DC4 character (ASCII code (20)_D or CTRL-T).

ASCII code sequence

Decimal	(27) _D (87) _D (n)
Hexadecimal	<1D> _H <57> _H <n>

Where n is either "0" or "1".

ESC M

(Elite Characters)

Name Elite size characters

Format CHR\$(27); "M";

Function To set the character size to print pseudo-elite characters.

When this sequence is executed, the characters are printed in elite mode. In normal size characters, this means characters 2.4 mm high, 1.5 mm wide and a pitch of 2.0 mm.

It is also possible to use the emphasized, condensed and enlarged form of these characters by use of the appropriate commands.

The elite mode can be cancelled by use of the <ESC> P command.

The elite mode is also cancelled if the width or height command is issued. If the character height and/or width has been set with the <GS> H or <GS> W commands, issuing an <ESC> M sequence will cancel these heights. However, if any other commands such as enlarge or condensed have been used in conjunction with the height or width commands, these will not be cancelled.

Example

```
10 LPRINT "Pica Size Characters"
20 LPRINT CHR$(27); "M";
30 LPRINT "Elite Size Characters"
```

Pica Size Characters
Elite Size Characters

ASCII code sequence

Decimal	(27) _D (77) _D
Hexadecimal	<1B> _H <4D> _H

ESC P

(Standard Characters)

Name Standard size character setting.

Format CHR\$(27); "P";

Function To set the HI-80 size to print standard size characters. In the normal mode, these are 2.4 mm high and 1.6 mm wide with a spacing of 2.4 mm.

If the character height and/or width has been set with the <GS> H or <GS> W commands, issuing an <ESC> P sequence will cancel these heights. However, if any other commands such as enlarge or condensed have been used in conjunction with the height or width commands, these will not be cancelled.

ASCII code sequence

Decimal	(27) _D (80) _D
Hexadecimal	<1B> _H <50> _H

GS H (n1) (n2)

(Height)

Name Character height setting

Format CHR\$(29); "H"; CHR\$(n1); CHR\$(n2)

Function To set the height of printed characters.

This sequence enables the height of the characters to be set in 0.1 mm units. The minimum height is 4 units. The maximum height is the height of the paper when the command is given.

NOTE:

If the direction of printing is changed from portrait to landscape, the character height may be too great to fit on the paper. The HI-80 will then attempt to replace the paper and may still be unable to fit the character on the paper. If this change is made, reset the height of the characters.

The value of the height is given in the sequence as two ASCII codes. The calculation to determine the codes from the required height is carried out as follows:

When a width less than the minimum value or greater than the maximum value is given the command sequence is ignored and the previous setting remains.

The height is divided by 256 and the integer part of the answer is used as the code (n1). The remainder from the division is used for the code (n2).

As a consequence of the maximum height being dependant on the paper size setting, the maximum setting varies. A table showing the largest height for the characters is shown on the next page.

The character height can be determined from the values of n1 and n2 by the expression:

$$\text{character height} = 0.1 \times (n1 \times 256 + n2) \text{ mm.}$$

The expression used to determine (n1) and (n2) in MICROSOFT BASIC for a height (n) is:

$$\begin{aligned} n1 &= \text{INT}(n/256) \\ n2 &= n \text{ MOD } 256 \end{aligned}$$

Some versions of BASIC do not have the MOD function. In this case the values of n1 and n2 can be determined as follows:

$$\begin{aligned} n1 &= \text{INT}(n/256) \\ n2 &= n - n1 \times 256 \end{aligned}$$

When the character height is selected, the pen moves down the paper to the position of the character baseline. If the height is specified to be greater than the height of the paper, the paper change procedure will be invoked. This will also happen if the height is changed and the position of the baseline for the enlarged character is outside the effective drawing area because the pen was positioned part of the way down the paper.

The largest sizes of characters which can fit on the paper are:

PAPER SIZE	Height in portrait	n1 / n2	Height in landscape	n1 / n2
A4	2670	(10) _D /(110) _D	1920	(7) _D /(128) _D
US letter	2510	(9) _D /(206) _D	1920	(7) _D /(128) _D
B5	2270	(8) _D /(222) _D	1640	(6) _D /(104) _D

This command does not change the width of the characters, nor does it change the setting if enlarged, condensed or enhanced has been specified.

Example

```
10 FOR J = 1 TO 30
20 LPRINT CHR$(29); "H"; CHR$(0); CHR$(J);
30 LPRINT "A";
40 NEXT J
```

Note that there is a semi-colon at the end of line 20 so that the size is changed whilst keeping the characters on the same line. Because the characters are on the same line, the paper does not move to reset the baseline. However, if this program were run when plotting or other printing had taken place, the larger characters could overwrite output on the lines above.

AAA-----

ASCII code sequence

Decimal	(29) _D	(72) _D	(n1)	(n2)
Hexadecimal	<1D> _H	<48> _H	<n1>	<n2>

Where (n1) (n2) are the ASCII codes for the parameters determining the character height.

GS W (n1) (n2)

(Width)

Name

Character width setting

Format

CHR\$(29); "W"; CHR\$(n1); CHR\$(n2)

Function

To set the width of printed characters.

This sequence enables the width of the characters to be set in 0.1 mm units. The minimum width is 4 units. The maximum width depends on the current setting of the margins.

When a width less than the minimum value or greater than the maximum value is given the command sequence is ignored and the previous setting remains.

NOTE:

If the margin is changed or the paper is changed from landscape to portrait position, and the setting of the width is changed, the character will be too big to fit on the paper. In this case the HI-80 will try to change the paper because clipping is not carried out in printer mode. If you change the margin or turn the direction of printing, reset the width of the characters to the new conditions.

The value of the width refers to the character spacing and corresponds to the interval between characters. The actual width of the character is 2/3 of the interval.

This command does not change the height of the characters, nor does it change the setting if enlarged, condensed or enhanced has been specified.

The value of the width is given in the sequence as two ASCII codes. The calculation to determine the codes from the required height is carried out as follows:

The width is divided by 256 and the integer part of the answer is used as the code (n1). The remainder from the division is used for the code (n2).

The maximum width of the characters depends on the size of paper. A table showing the maximum width is shown on the next page.

The character width can be determined from the values of n1 and n2 by the expression:

$$\text{character height} = 0.1 \times (n1 \times 256 + n2) \text{ mm.}$$

The expression used to determine (n1) and (n2) in MICROSOFT BASIC for a width (n) is:

$$n1 = \text{INT}(n/256) \quad n2 = n \text{ MOD } 256$$

Some versions of BASIC do not have the MOD function. In this case the values of n1 and n2 can be determined as follows:

$$n1 = \text{INT}(n/256) \\ n2 = n - n1 \times 256$$

The largest sizes of characters which can fit on the paper are:

PAPER SIZE	Width in portrait	n1 / n2	Width in landscape	n1 / n2
A4	1920	(7) _D /(128) _D	2670	(10) _D /(110) _D
US letter	1920	(7) _D /(128) _D	2510	(9) _D /(206) _D
B5	1640	(6) _D /(104) _D	2270	(8) _D /(222) _D

Example

```
10 FOR J = 10 TO 100 STEP 10
20 LPRINT CHR$(29); "W"; CHR$(0); CHR$(J);
30 LPRINT "A";
40 NEXT J
```

Note that there is a semi-colon at the end of line 20 so that the size is changed whilst keeping the characters on the same line.

AAAAA ^ ^ ^ ^ ^

ASCII code sequence

Decimal (29)_D (87)_D (n1) (n2)
Hexadecimal <1D>_H <57>_H <n1> <n2>

Where (n1) (n2) are the ASCII codes for the parameters determining the character width.

6.3 Commands Relating to Character Quality and Position

ESC E

(Emphasized)

Name Emphasized printing mode

Format CHR\$(27);"E"

Function To set the mode of printing to emphasized.

When this command is executed, characters are printed twice with a horizontal offset. There is only one type of emphasized printing, which is equivalent to the plotter mode 0 command "EM1".

The pen is shifted 1/16 of the width interval before the second printing of the character.

If the width is such that 1/16 of the width interval is greater than 0.3 mm, the offset will be set to 0.3 mm.

The sequence does not alter the character width.

It is possible to set both emphasized and double strike at one and the same time.

Example 10 LPRINT "ABCDEFGHijklmn"
20 LPRINT CHR\$(27); "E"; "ABCDEFGHijklmn"

ABCDEFGHijklmn
ABCDEFGHijklmn

ASCII code sequence

Decimal	(27) _D (69) _D
Hexadecimal	<1B> _H <45> _H

ESC F

(Emphasized Cancel)

Name Emphasized printing mode cancel

Format CHR\$(27);"F"

Function To cancel the emphasized printing mode.

When this command is executed, the emphasized printing mode is cancelled.

ASCII code sequence

Decimal	(27) _D (70) _D
Hexadecimal	<1B> _H <46> _H

ESC G

(Double Strike)

Name

Double strike mode

Format

CHR\$(27); "G"

Function

To set the mode of printing to double strike.

When this command is executed, characters are printed twice with a vertical offset. This is equivalent to the plotter mode 0 command "EM2".

The pen is shifted 1/16 of the height before the second printing of the character.

If 1/16 of the height is greater than 0.3 mm, the offset will be set to 0.3 mm.

The sequence does not alter the character width.

It is possible to set both emphasized and double strike at one and the same time.

Example

10 LPRINT "ABCDEFGHijklmn"

20 LPRINT CHR\$(27); "G"; "ABCDEFGHijklmn"

ABCDEFGHijklmn
ABCDEFGHijklmn

ASCII code sequence

Decimal
Hexadecimal

(27)_D (71)_D
<1B>_H <47>_H

ESC H

(Double strike cancel)

Name

Double strike mode cancel

Format

CHR\$(27); "H"

Function

To cancel the double strike printing mode.

When this command is executed, the double strike printing mode is cancelled.

ASCII code sequence

Decimal
Hexadecimal

(27)_D (72)_D
<1B>_H <48>_H

ESC S (n)

(Superscript/Subscript)

Name

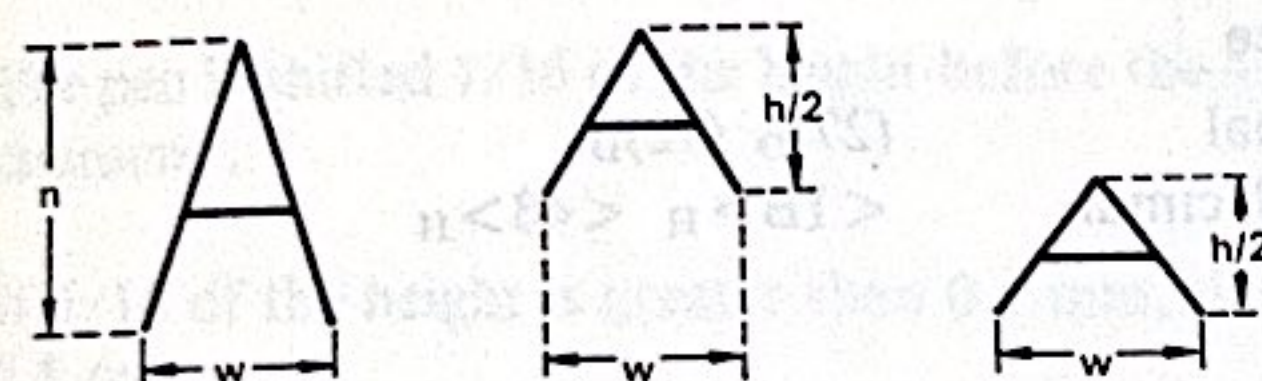
Superscript and subscript modes

Format

CHR\$(27); "S" ; CHR\$(n);

Function

To set the superscript and subscript printing modes. The superscript and subscript modes print the characters at half the previous character height. If (n) is (0)_D the characters are printed in the upper half of the character space (superscript). If (n) is (1) the characters are printed in the lower half (subscript). The following diagram shows the positions:



The super or subscript mode can be cancelled by the <ESC> "T" command.

Example

```
LPRINT CHR$(27) ; "S"; CHR$(0)
LPRINT "Superscript";
LPRINT CHR$(27) ; "T";
LPRINT "NORMAL";
LPRINT CHR$(27) ; "S"; CHR$(1);
LPRINT "Subscript"
```

SuperscriptNORMALSubscript

ASCII Code sequence

Decimal	(27) _D (83) _D (n)
Hexadecimal	<1B> _H <53> _H <n>

Where n is either "0" for superscript or "1" for subscript.

ESC T

(Cancel superscript/subscript)

Name

Superscript/subscript printing mode cancel.

Format

CHR\$(27); "T"

Function

To cancel either the superscript or subscript mode.

ASCII code sequence

Decimal	(27) _D (84) _D
Hexadecimal	<1B> _H <54> _H

ESC - (n)

(Underline)

Name

Underline on/off mode

Format

CHR\$(27); "-" ; CHR\$(n);

Function

To set the underline printing mode and cancel it when required.

The value of (n) can be either 0 or 1.

If n = 1 the underlined print mode is set until it cancelled. All characters including spaces are underlined.

If n = 0 the underlined mode is cancelled.

Note:

Care should be taken when using horizontal tabbing.

If the BASIC "TAB" command is used or a word processor or other applications software moves to the tab position by means of a series of spaces the spaces will all be underlined. This can be a problem if the TAB command is given at the beginning of a line, so the TAB should be given before the underline is switched on.

If the HT command (ASCII code (9)_D) is sent to tab to the positions set by the <ESC> "D" command, the underlining will be carried out from this tab position and not from the beginning of the line.

Example

```
10 LPRINT CHR$(27); "-"; CHR$(1);
20 LPRINT TAB(10); "Tab to position 10 using BASIC command"
30 LPRINT "Tab using the 'HT' command"
40 LPRINT CHR$(9); "First position";
50 LPRINT CHR$(9); "Second position";
60 LPRINT CHR$(27); "-"; CHR$(0);
70 LPRINT "NORMAL";
```

Tab to position 10 using BASIC command
Tab using the 'HT' command
First position Second position
NORMAL

ASCII code sequence

Decimal (27)_D (45)_D (n)
Hexadecimal <1B>_H <2D>_H <n>

Where n is either (0)_D to cancel underlining, or (1)_D to set it.

6.4 Commands Related to Alternate Character Sets

ESC R (n) (Character Set)

Name Select character set.

Format CHR\$(27); "R" ; CHR\$(n);

Function To select which of the international character sets are to be printed. The value of (n) determines the character set for a particular country. This enables the characters which are special to the alphabet of that country to be chosen as the recognised modification to the ASCII code table. The characters produced for various codes when the value of (n) is within the range 0 to 10 is shown below.

value of n	country	(35) _D	(36) _D	(64) _D	(91) _D	(92) _D	(93) _D	(94) _D	(96) _D	(123) _D	(124) _D	(125) _D	(126) _D
0	U.S.A	#	\$	@	[	\	]	^	'	{		}	~
1	France	#	\$	à	°	ç	é	è	'	é	ù	è	~
2	Germany	#	\$	ß	Ä	Ö	Ü	^	'	ä	ö	ü	ß
3	England	£	\$	@	[	\	]	^	'	{		}	~
4	Denmark	#	\$	@	Æ	Ø	Å	^	'	æ	ø	å	~
5	Sweden	#	¤	É	Å	Ö	Å	Ü	é	ä	ö	å	ü
6	Italy	#	\$	@	°	\	é	è	ù	à	ò	è	ì
7	Spain	¢	\$	@	;	Ñ	¿	^	'	~	ñ	}	~
8	Japan	#	\$	@	[	¥	]	^	'	{		}	~
9	Norway	#	¤	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
10	Denamrk II	#	\$	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü

Note:

The ASCII code corresponding to the character set must sent and not that corresponding to the number as was the case with plotter mode 0. For example with this command ASCII code (3)_D would be required for English characters, but with the plotter mode commands ASCII code (51)_D would be needed because the character "3" is sent.

Example

```
10 LPRINT CHR$(27); "R"; CHR$(3);
20 LPRINT "#$[\]^'{}~"
```

would print: £\$[\]^'{}~

because set 3 is the English character set.

ASCII code sequence

Decimal (27)_D (82)_D (n)
Hexadecimal <1B>_H <52>_H <n>

Where (n) is 0 to 10 depending on the character set required.

GS I (n1) (n2)

(Italics)

Name

Set Italic printing mode.

Format

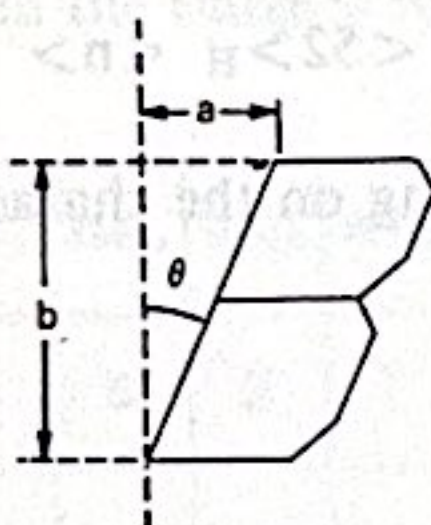
CHR\$(29) ; "I"; CHR\$(n1) ; CHR\$(n2);

Function

To set italic printing mode, with the characters printed at a defined slant.

NOTE:

The <ESC> "4" command is used to set italic characters with a slant of 9 degrees. If this command is given after the <GS> "I" command an extra slant of 9 degrees will be added. The description of the <ESC> "4" and <ESC> "5" commands give further details of this.



The slant is defined by the values of (n1) and (n2) as follows.

The inclination is measured as the tangent of the angle of inclination to the vertical. If "n" is given by the expression:

$$n = 256 \times \tan(\theta)$$

or $n = 256 \times a/b$

where a and b are as shown in the diagram:

then n1 and n2 are determined as follows in MICROSOFT BASIC:

$$n1 = \text{INT}(n/256)$$

$$n2 = n \text{ MOD } 256$$

If a version of BASIC does not have the MOD function, the value of n2 may be found from the expression:

$$n2 = n - n1 \times 256$$

The value of n can range from 0 (normal vertical characters) to 512 (with a slope of about 63 degrees). If a value greater than 512 is given to n, the previous value will be used, without generating an error.

The values of n1 and n2 should be set to 0 to return to normal characters.

Example

```
10 'Italic Printing
20 FOR I=0 TO 300 STEP 30
30 LPRINT CHR$(29); "I"; CHR$(INT(I/256)); CHR$(I MOD 256);
40 LPRINT "n="; I;
45 IF I=0 THEN LPRINT " ";
46 IF I=30 OR I=60 OR I=90 THEN LPRINT " ";
47 LPRINT "BBBBBBBBBB"
50 NEXT
```

n= 0	BBBBBBBBBB
n= 30	BBBBBBBBBB
n= 60	BBBBBBBBBB
n= 90	BBBBBBBBBB
n= 120	BBBBBBBBBB
n= 150	BBBBBBBBBB
n= 180	BBBBBBBBBB
n= 210	BBBBBBBBBB
n= 240	BBBBBBBBBB
n= 270	BBBBBBBBBB
n= 300	BBBBBBBBBB

ASCII code sequence

Decimal	(29) _D (73) _D (n)
Hexadecimal	<1B> _H <49> _H <n>

ESC 4

(Set Italics)

Name Select alternate italic character set.

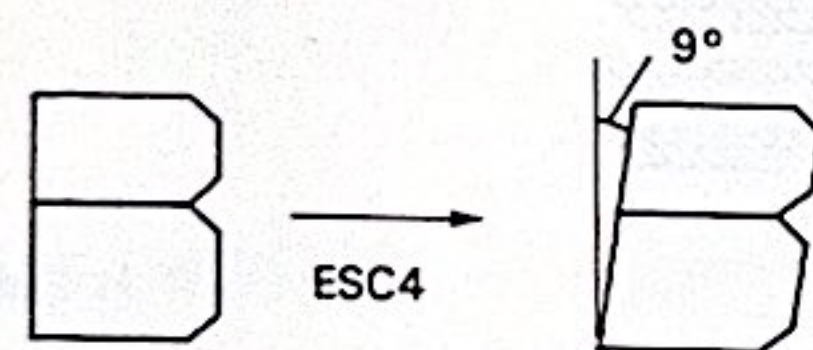
Format CHR\$(27); "4";

Function To select the alternate, i.e. italic character set.

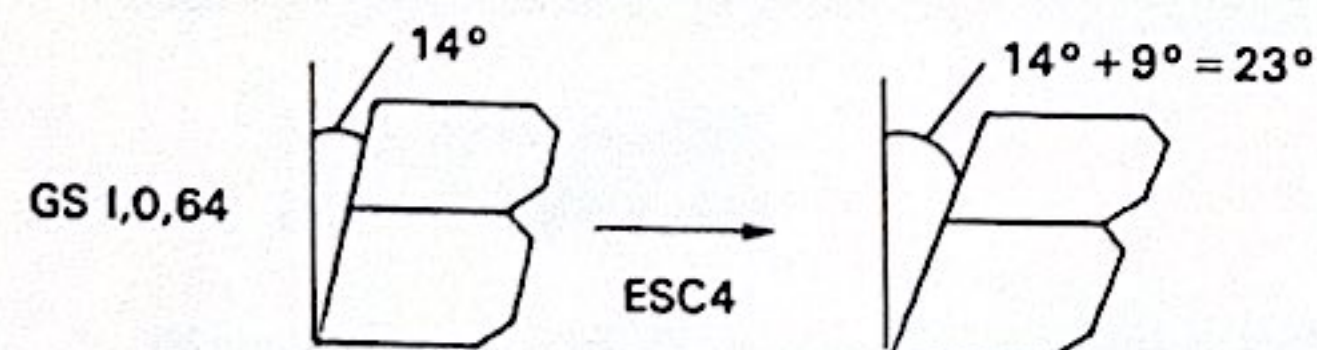
This command is in contrast to the <GS> "I" command which adds a slant of a specified angle to the characters.

It is also possible to obtain the italic characters by printing the ASCII code of the character with the high bit set, i.e. adding 128 to the ASCII code of the character required. Thus "A" has ASCII code (65)_D and an italic "A" will be produced if ASCII code (65 + 128)_D = (193)_D is printed.

The inclination of the characters is 9 degrees.



If the <ESC> "4" command is given after the <GS> "I" command has been given, the result will be to add a further 9 degrees to the inclination of the characters set by the <GS> "I" command.



ASCII code sequence

Decimal	Hexadecimal	(27) _D (52) _D
		<1B> _H <34> _H

ESC 5

(Deselect Italics)

Name

Deselect alternate italic character set.

Format

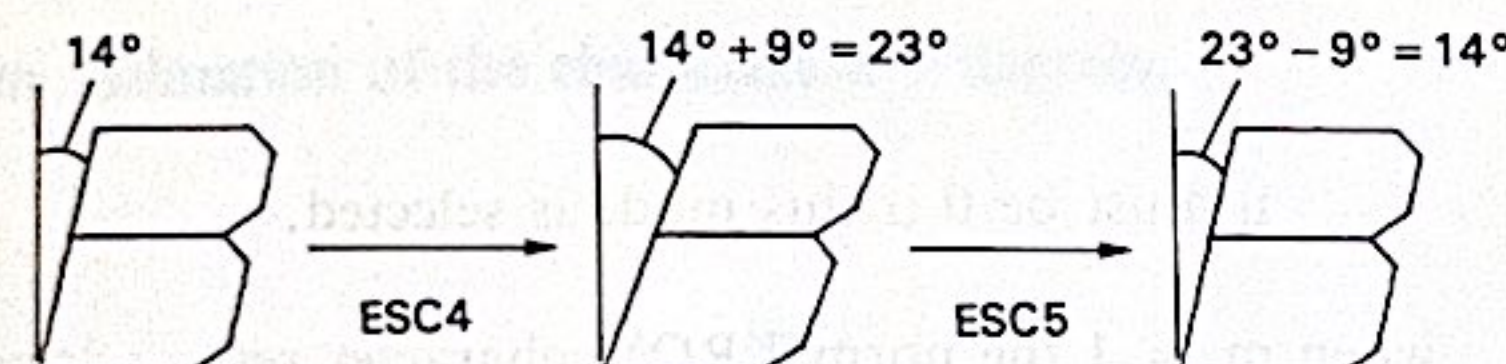
CHR\$(27); "5";

Function

To return to the normal character set.

This command cancels the <ESC> "4" command.

If the <ESC> "4" command has been given after the <GS> "I" command and a further 9 degrees have been added to the inclination of the characters set by the <GS> "I" command, these extra degrees will be removed, but the inclination set by the <GS> "I" command will remain. If the <ESC> "5" command is given when the italics set has not been selected by <ESC> "4", no action will take place.



ASCII code sequence

Decimal	(27) _D (53) _D
Hexadecimal	<1B> _H <35> _H

ESC % (m) (n)* (ROM/DOWNLOAD character set)

Name

Select ROM or Download Character set from RAM.

Format

CHR\$(27); "%"; CHR\$(m); CHR\$(n);

Function

To select either the normal ROM character set, or the Download characters.

Notes:

When using this function, the optional RAM is required for the download characters, and the characters must have been defined in plotter mode 0. If the optional RAM is not fitted or the user defined characters have not been set, the normal characters will be printed if an attempt is made to set the Download characters.

m can have a value 0 or 1

when m = 0 the download characters are chosen
n must be 0 if this mode is selected.

when m = 1 the normal ROM character set is selected
n = 0 to 10 and denotes the international character set as selected by the <ESC> R sequence.

ASCII code sequence

Decimal	(27) _D (37) _D (m) (n)
Hexadecimal	<1B> _H <25> _H <m> <n>

Where m is 0 if the internal ROM characters are used, in which case n can have the value 0 to 10 depending on which international character set is required.

If m = 1 the download characters are printed and n must then be 0.

6.5 Commands Determining Paper Line Feed

LF

(Line feed)

Name Line Feed

Format CHR\$(10);

Function To advance the paper one line.

The CR command contains a discussion of the effect of carriage returns and line feeds. A carriage return is added to a line feed in the same way that a line feed is added to a carriage return. If a line feed without a carriage return is required, use the <ESC> J command.

When the default value is used, the paper is fed by 4.2 mm (approximately 1/6 inch) when the line feed code is executed.

A line feed will cancel the enlarged characters set by the SO character and by the <ESC> SO sequence.

ASCII code sequence

Decimal (10)_D
Hexadecimal <0A>_H

ESC 0, ESC 1, ESC 2

(Line spacing)

Name Set fixed interval line spacing.

Format CHR\$(27) ; "0";
CHR\$(27) ; "1"; and
CHR\$(27) ; "2";

Function To set the line spacing for normal characters to 1/8, 7/72, and 1/6 of an inch.

Note:

The character to be sent is the digit 0, 1 or 2 and therefore ASCII codes (48)_D, (49)_D and (50)_D respectively.

When this code is sent the line spacing is altered as follows:

<ESC> 0	3.2 mm	approx 1/8 inch
<ESC> 1	2.8 mm	approx 7/72 inch
<ESC> 2	4.2 mm	approx 1/6 inch

The line spacing denotes the distance between the baseline of characters on successive lines of text. It also applies to standard height characters, including enlarged characters produced by the SO and <ESC> SO commands, and condensed characters produced by the SI command. Characters which are increased in height using the <GS> H command will have a line spacing which reflects the increase in height.

ASCII code sequence

Decimal (27)_D (m)_D
Hexadecimal <1B>_H <m>_H

Where m is the ASCII code for the digits 0, 1 or 2, ie. (48)_D (49)_D or (50)_D respectively in decimal and <30>_H, <31>_H and <32>_H in hexadecimal respectively.

ESC 3 (n)

(n/216" Line spacing)

Name

Set line spacing in multiples of 1/216"

Format

CHR\$(27) ; "3"; CHR\$(n);

Function

To set the line spacing for normal characters in multiples of approximately 1/216 inch.

Note:

The characters to be sent are the digit 3 (ASCII codes (51)_D, <33>_H) followed by the ASCII code for the multiple of 1/216" required.

Since the HI-80 works in millimeters and not inches, the value of (n) will give a spacing in millimeters calculated as follows:

$$P \text{ mm} = n \times 0.1 \times 254/216$$

The HI-80 has a resolution of 0.1 mm, so values will be truncated to this level of accuracy. For example if (n) has the value (30)_D, the calculated value of P will be 3.52 mm. The line spacing will be set to 3.5 mm.

The line spacing denotes the distance between the baseline of characters on successive lines of text. It also applies to standard height characters, including enlarged characters produced by the SO and <ESC> SO commands, and condensed characters produced by the SI command.

If characters which are increased in height using <GS> H command are required, the line spacing should be set using the <GS> F command sequence.

Example

```
10 FOR I=0 TO 10
20 LPRINT CHR$(27); "3"; CHR$(I);
30 LPRINT "Line spacing in multiples of 1/216 inch"
40 NEXT
```



ASCII code sequence

Decimal

(27)_D (51)_D (n)

Hexadecimal

<1B>_H <33>_H <n>

Where n is the value of the multiple of the 1/216 inch required.

ESC A (n)

(n/72" Line spacing)

Name

Set line spacing in multiples of 1/72"

Format

CHR\$(27) ; "A"; CHR\$(n);

Function

To set the line spacing for normal characters in multiples of approximately 1/72 inch.

Note:

The characters to be sent are the letter "A" (ASCII codes (65)_D, <41>_H) followed by the ASCII code for the multiple of 1/72" required.

Since the HI-80 works in millimeters and not inches, the value of (n) will give a spacing in millimeters calculated as follows:

$$P \text{ mm} = n \times 0.1 \times 254/72$$

Since the HI-80 has a resolution of 0.1 mm, values will be truncated to this level of accuracy. For example if (n) has the value (30)_D, the calculated value of P will be 10.583 mm. The line spacing will be set to 10.5 mm.

If the value of (n) goes above 127, the line spacing will be set to (n) - 128.

The line spacing denotes the distance between the baseline of characters on successive lines of text. It also applies to standard height characters, including enlarged characters produced by the SO and <ESC> SO commands, and condensed characters produced by the SI command.

If characters which are increased in height using the <GS> H command are required the line spacing should be set using the <GS> F command sequence.

Example

```
10 FOR I=0 TO 10
20 LPRINT CHR$(27); "A"; CHR$(I);
30 LPRINT "Line spacing in multiples of 1/72 inch"
40 NEXT
```

```
Line spacing in multiples of 1/72 inch
Line spacing in multiples of 1/72 inch
Line spacing in multiples of 1/72 inch
Line spacing in multiples of 1/72 inch
Line spacing in multiples of 1/72 inch
Line spacing in multiples of 1/72 inch
Line spacing in multiples of 1/72 inch
Line spacing in multiples of 1/72 inch
Line spacing in multiples of 1/72 inch
Line spacing in multiples of 1/72 inch
Line spacing in multiples of 1/72 inch
```

ASCII code sequence

Decimal	(27) _D	(65) _D	(n)
Hexadecimal	<1B> _H	<41> _H	<n>

Where n is the value of the multiple of the 1/72 inch required.

ESC J (n)

(n/216" Line feed one line)

Name

Multiples of 1/216 inch for one line only

Format

CHR\$(27) ; "J"; CHR\$(n);

Function

To feed the paper in multiples of approximately 1/216 inch for one line only. No carriage return is added to the line feed.

It is equivalent to giving a line feed command with a particular spacing added to the command. No carriage return is added to the line feed. If the command is issued with a line feed as well, for example in BASIC leaving the semi-colon off the end of the command, the paper will be fed with the spacing set by the <ESC> J command, and then fed one further line at the spacing set previously.

The setting of the line spacing obtained before this command is given is not changed.

NOTE:

The characters to be sent are the letter "J" (ASCII code (74)_D, <4A>_H) followed by the ASCII code for the multiple of 1/216" required.

The value of (n) is determined exactly as for the <ESC> 3 sequence.

Example

```
10 LPRINT "ESC J+n command";
20 LPRINT CHR$(27); "J"; CHR$(60);
30 LPRINT "n/216 inch Line Feed"
```

ESC J+n command

n/216 inch Line Feed

ASCII code sequence

Decimal	(27) _D (74) _D (n)
Hexadecimal	<1B> _H <4A> _H <n>

Where n is the value of the multiple of the 1/216 inch required.

GS F

(Auto line spacing)

Name

Auto line spacing for extended height characters.

Format

CHR\$(29); "F";

Function

To set the line feed pitch when the height of the characters has been altered using the <GS> H command.

If this setting were not possible, the extended height characters would print on top of one another because the line spacing would only be appropriate to the normal characters, and a separate command would be required to set the line spacing for the particular character height chosen.

The command is executed when the power is switched on, so that changing the height of the characters will automatically set the line spacing.

The line spacing is set as 7/4 the height of the characters on the previous line.

If the character height is increased, this probably means that the new line is printed with the characters overlapping those on the previous line. This can be overcome by executing a carriage return before printing the characters at the new height.

If a command <ESC> 0, <ESC> 1, <ESC> 2, <ESC> 3 (n), <ESC> A (n) or <ESC> J (n) has been executed, the auto line spacing for extended height characters will be cancelled, and the <GS> F command must be executed to reset it. When these other commands are executed, the line spacing is set absolutely to the values they specify. When the <GS> F command is executed, 7/4 of the height of the character on the previous line is used as the line spacing.